



4

SEQUENCE LISTING

<110> Blinkovsky, Alexander
Berka, Randy
Rey, Michael
Golightly, Elizabeth
Klotz, Alan
Mathisen, Thomas Erik
Dambmann, Claus

<120> Carboxypeptidases And Nucleic Acids
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<140> 09/712,338

<141> 2000-11-13

<150> 08/943,714

<151> 1997-10-03

<150> 08/726,880

<151> 1996-10-04

<150> PCT/DK97/00230

<151> 1997-05-20

<150> PA 1996 00585

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<213> *Aspergillus oryzae*

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actcttaca	ccgcaaaca	tgtcaccatc	cggtagaagg	aaccggggc	agagggcgtc	180
tgcgagacta	ccccgggtgt	caaatcctac	tctggatatg	tcgacacctc	tcccagatcc	240
cataccttct	tctggttctt	cgaagccaga	cataacccag	aaactgcacc	tatcacattg	300
tggttgaatg	gtggccctgg	aagcgattct	ttgatcggtc	tcttcgaaga	gttggggcct	360
tgccatgtca	attcgacttt	tgatgactac	atcaaccctc	actcgtggaa	cgaggtctcc	420
aatttactat	tcctgtccca	gccattggga	gtcggctttt	catatagtga	tacggttgat	480
gggtccatta	accctgtaac	tggggtcgtc	gaaaattcga	gctttgcagg	agttcagggc	540
cggtagccaa	ccattgatgc	cactctgatc	gatactacca	atcttgccgc	agagggcgct	600
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aaggacttca	gtctatggac	ggagagctat	ggagggcact	atggctctgc	attcttcaat	720
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ttcaactctc	tgggaattat	taacggcatc	atcgacgagg	cgatccaggc	cccttactac	840
cctgaattcg	ctgtgaacaa	tacctacggg	atcaaggctg	tcaacgagac	cgtctacaac	900
tacatgaagt	ttgccaacca	aatgccaaat	ggttgccagg	atttgatttc	cacctgcaaa	960

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catccatatg	atgacccgac	tccgccaaagt	tattacaaca	aatttctggc	aaaggactct	1140
gtcatggacg	ctatcggcgt	caacatcaac	tacaccagct	ccaataatga	cgtctactac	1200
gctttccagc	aaacaggcga	ctttgtctgg	cccaacttca	tcgaagacct	cgaggagatc	1260
cttgctctcc	ccgtgcgtgt	ctccctcatc	tatggcgacg	ccgattacat	ctgcaactgg	1320
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gcagggtaca	cgccccctgaa	agtcaacggc	gtcgagtatg	gggaaactcg	cgagtatggt	1440
aatttctcct	tactcgcgt	ctatgaggca	ggccatgaag	tcccatacta	ccagcccatac	1500
gcctccctgc	aattgtttaa	ccggactatc	ttcggttggg	atatcgcaga	gggccagaag	1560
aagatctggc	ccagctacaa	gacgaatgga	acggctacag	ctacgcatac	acagtcgtcc	1620
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 <213> Aspergillus oryzae

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Thr	Ile	Arg	Tyr	Lys	Glu	Pro	Gly	Ala	Glu	Gly	Val	Cys	Glu	Thr	Thr
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Thr	Asn	Leu	Ala	Ala	Glu	Ala	Ala	Trp	Glu	Ile	Leu	Gln	Gly	Phe	Leu
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Ser	Gly	Leu	Pro	Ser	Leu	Asp	Ser	Arg	Val	Gln	Ser	Lys	Asp	Phe	Ser
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Leu	Trp	Thr	Glu	Ser	Tyr	Gly	Gly	His	Tyr	Gly	Pro	Ala	Phe	Phe	Asn
225				230						235					240
His	Phe	Tyr	Glu	Gln	Asn	Glu	Arg	Ile	Ala	Asn	Gly	Ser	Val	Asn	Gly
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Val	Gln	Leu	Asn	Phe	Asn	Ser	Leu	Gly	Ile	Ile	Asn	Gly	Ile	Ile	Asp
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Glu	Ala	Ile	Gln	Ala	Pro	Tyr	Tyr	Pro	Glu	Phe	Ala	Val	Asn	Asn	Thr
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Tyr	Gly	Ile	Lys	Ala	Val	Asn	Glu	Thr	Val	Tyr	Asn	Tyr	Met	Lys	Phe
	290					295					300				

Ala Asn Gln Met Pro Asn Gly Cys Gln Asp Leu Ile Ser Thr Cys Lys
 305 310 315 320
 Gln Thr Asn Arg Thr Ala Leu Ala Asp Tyr Ala Leu Cys Ala Glu Ala
 325 330 335
 Thr Asn Met Cys Arg Asp Asn Val Glu Gly Pro Tyr Tyr Ala Phe Ala
 340 345 350
 Gly Arg Gly Val Tyr Asp Ile Arg His Pro Tyr Asp Asp Pro Thr Pro
 355 360 365
 Pro Ser Tyr Tyr Asn Lys Phe Leu Ala Lys Asp Ser Val Met Asp Ala
 370 375 380
 Ile Gly Val Asn Ile Asn Tyr Thr Gln Ser Asn Asn Asp Val Tyr Tyr
 385 390 395 400
 Ala Phe Gln Gln Thr Gly Asp Phe Val Trp Pro Asn Phe Ile Glu Asp
 405 410 415
 Leu Glu Glu Ile Leu Ala Leu Pro Val Arg Val Ser Leu Ile Tyr Gly
 420 425 430
 Asp Ala Asp Tyr Ile Cys Asn Trp Phe Gly Gly Gln Ala Val Ser Leu
 435 440 445
 Ala Ala Asn Tyr Ser Gln Ala Ala Gln Phe Arg Ser Ala Gly Tyr Thr
 450 455 460
 Pro Leu Lys Val Asn Gly Val Glu Tyr Gly Glu Thr Arg Glu Tyr Gly
 465 470 475 480
 Asn Phe Ser Phe Thr Arg Val Tyr Glu Ala Gly His Glu Val Pro Tyr
 485 490 495
 Tyr Gln Pro Ile Ala Ser Leu Gln Leu Phe Asn Arg Thr Ile Phe Gly
 500 505 510
 Trp Asp Ile Ala Glu Gly Gln Lys Lys Ile Trp Pro Ser Tyr Lys Thr
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 <213> *Aspergillus oryzae*

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<212> PRT

<213> *Aspergillus oryzae*

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Glu Asp Leu
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<213> *Aspergillus oryzae*

<220>

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<212> DNA

<213> *Aspergillus oryzae*

<220>

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<213> *Aspergillus oryzae*

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<210> 9
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 35 40 45
 Phe Asn Gly Gly Pro Gly Cys Ser Ser Met Ile Gly Leu Phe Gln Glu
 50 55 60
 Asn Gly Pro Cys His Phe Val Asn Gly Asp Ser Thr Pro Ser Leu Asn
 65 70 75 80
 Glu Asn Ser Trp Asn Asn Tyr Ala Asn Met Ile Tyr Ile Asp Gln Pro
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 Ile Gly Val Gly Phe Ser Tyr Gly Thr Asp Asp Val Thr Ser Thr Val
 100 105 110
 Thr Ala Ala Pro Tyr Val Trp Asn Leu Leu Gln Ala Phe Tyr Ala Gln
 115 120 125
 Arg Pro Glu Tyr Glu Ser Arg Asp Phe Ala Ile Phe Thr Glu Ser Tyr
 130 135 140
 Gly Gly His Tyr Gly Pro Glu Phe Ala Ser Tyr Ile Glu Gln Gln Asn
 145 150 155 160
 Ala Ala Ile Lys Ala Gly Ser Val Thr Gly Gln Asn Val Asn Ile Val
 165 170 175
 Ala Leu Gly Val Asn Asn Gly Trp Ile Asp Ser Thr Ile Gln Glu Lys
 180 185 190
 Ala Tyr Ile Asp Phe Ser Tyr Asn Asn Ser Tyr Gln Gln Ile Ile Asp
 195 200 205
 Ser Ser Thr Arg Asp Ser Leu Leu Asp Ala Tyr Asn Asn Gln Cys Leu
 210 215 220
 Pro Ala Leu Gln Gln Cys Ser Gln Ser Gly Ser Thr Ser Asp Cys Thr
 225 230 235 240
 Asn Ala Asp Ser Val Cys Tyr Gln Asn Ile Glu Gly Pro Ile Ser Ser
 245 250 255
 Ser Gly Asp Phe Asp Val Tyr Asp Ile Arg Glu Pro Ser Asn Asp Pro
 260 265 270
 Tyr Pro Pro Lys Thr Tyr Ser Thr Tyr Leu Ser Asp Pro Thr Val Val
 275 280 285
 Lys Ala Ile Gly Ala Arg Thr Asn Tyr Gln Glu Cys Pro Asn Gly Pro
 290 295 300
 Tyr Asn Lys Phe Ala Ser Thr Gly Asp Asn Pro Arg Ser Phe Leu Ser
 305 310 315 320
 Thr Leu Ser Ser Val Val Gln Ser Gly Ile Asn Val Leu Val Trp Ala
 325 330 335
 Gly Asp Ala Asp Trp Ile Cys Asn Trp Leu Gly Asn Tyr Glu Val Ala
 340 345 350
 Asn Ala Val Asp Phe Pro Gly Asn Ala Gln Phe Ser Ala Leu Asp Leu
 355 360 365
 Ala Pro Tyr Thr Val Asn Gly Val Glu Lys Gly Gln Phe Lys Thr Val
 370 375 380
 Asp Asn Phe Ser Phe Leu Lys Val Tyr Gly Ala Gly His Glu Val Pro
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<213> *Aspergillus oryzae*

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35 40 45
Ile Phe Gln Pro Thr Ile Gly Glu Pro Val Asp Glu Val Thr Ile Trp
50 55 60
Met Asn Gly Gly Pro Gly Cys Ser Ser Met Glu Ser Phe Leu Gln Glu
65 70 75 80
Thr Gly Arg Phe Leu Trp Gln Pro Gly Thr Tyr Ala Pro Val Glu Asn
85 90 95
Pro Tyr Ser Trp Val Val Leu Thr Asn Val Leu Trp Val Asp Gln Pro
100 105 110
Val Gly Thr Gly Tyr Ser Ile Gly Thr Pro Thr Ala Thr Ser Gln Glu
115 120 125
Glu Thr Ala Gln Asp Phe Val Lys Phe Phe Lys Asn Phe Gln Lys Thr
130 135 140
Tyr Gly Ile Lys Asn Phe Lys Ile Tyr Val Thr Gly Glu Ser Tyr Ala
145 150 155 160
Gly Arg Tyr Val Pro Tyr Ile Ser Ala Ala Met Leu Asp Glu Lys Asp
165 170 175
Lys Glu Tyr Phe Asp Leu Gln Gly Ala Leu Ala Tyr Asp Pro Cys Ile
180 185 190
Gly Gln Phe Asp Tyr Val Gln Glu Glu Ile Pro Val Val Pro Phe Val
195 200 205
Lys Glu Asn Ala Asn Leu Phe Asn Phe Asn Glu Thr Phe Met Ala Glu
210 215 220
Leu Glu His Leu His Lys Ser Cys Gly Tyr Ala Asp Phe Ile Asp Lys
225 230 235 240
Tyr Leu Thr Phe Pro Pro Lys Glu Gln Pro Pro Leu Phe Phe Asn
245 250 255
Tyr Thr Ser Met Ala Asn Glu Asp Val Phe Asp Met Val Tyr Asn Glu
260 265 270
Val Phe Lys Ile Asn Pro Cys Phe Asp Leu Tyr Glu Val Asn Leu Met
275 280 285
Cys Pro Leu Gln Trp Asp Val Leu Ala Phe Pro Thr Ser Leu Val Tyr
290 295 300
Gln Pro Ala Gly Ala Thr Val Tyr Phe Asp Arg Ala Asp Val Lys Lys
305 310 315 320
Ala Leu His Ala Pro Asn Val Thr Trp Ala Glu Cys Ser Asn Asn Pro
325 330 335
Val Phe Val Gly Gly Ser Ser Gly Pro Glu Gln Glu Gly Asp Thr Ser
340 345 350
Ala Asn Pro Ile Glu His Val Leu Pro Gln Val Ile Glu Ala Thr Asn
355 360 365

Arg	Val	Leu	Ile	Ser	Asn	Gly	Asp	Phe	Asp	Met	Val	Ile	Leu	Thr	Asn
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Phe	Gln	Lys	Lys	Pro	Ser	Ala	Pro	Ile	Asp	Ile	Lys	Ile	Pro	Asp	Leu
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Gln	Tyr	Lys	Glu	Val	Phe	Ala	Glu	Asn	Gly	Ala	Ser	Ser	Leu	Asp	Gly
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Ala	Gln	Gly	Ile	Met	Gly	Val	Gln	His	Tyr	Glu	Arg	Gly	Leu	Met	Lys
	435						440					445			
Ala	Gln	Thr	Tyr	Gln	Ser	Gly	His	Met	Gln	Pro	Gln	Tyr	Gln	Pro	Arg
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Gln															

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 <213> Aspergillus oryzae

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His	Arg	Ser	Val	Ala	Ser	Arg	Ala	Val	Pro	Val	Glu	Arg	Arg	Ser
	35					40					45			Asn
Asp	Phe	Glu	Tyr	Leu	Thr	Asn	Lys	Thr	Ala	Arg	Phe	Leu	Val	Asn
	50					55				60				Gly
Thr	Ser	Ile	Pro	Glu	Val	Asp	Phe	Asp	Val	Gly	Glu	Ser	Tyr	Ala
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Leu	Leu	Pro	Asn	Thr	Pro	Thr	Gly	Asn	Ser	Ser	Leu	Phe	Phe	Trp
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Phe	Pro	Ser	Gln	Asn	Pro	Asp	Ala	Ser	Asp	Glu	Ile	Thr	Ile	Trp
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Asn	Gly	Gly	Pro	Gly	Cys	Ser	Ser	Leu	Asp	Gly	Leu	Leu	Gln	Glu
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Gly	Pro	Phe	Leu	Trp	Gln	Pro	Gly	Thr	Tyr	Lys	Pro	Val	Pro	Asn
	130				135					140				Pro
Tyr	Ser	Trp	Thr	Asn	Leu	Thr	Asn	Val	Val	Tyr	Ile	Asp	Gln	Pro
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Gly	Thr	Gly	Phe	Ser	Pro	Gly	Pro	Ser	Thr	Val	Asn	Asp	Glu	Glu
			165						170				175	Asp
Val	Ala	Ala	Gln	Phe	Asn	Ser	Trp	Phe	Lys	His	Phe	Val	Asp	Thr
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Asp	Leu	His	Gly	Arg	Lys	Val	Tyr	Ile	Thr	Gly	Glu	Ser	Tyr	Ala
	195						200					205		Gly
Met	Tyr	Val	Pro	Tyr	Ile	Ala	Asp	Ala	Met	Leu	Asn	Glu	Glu	Asp
	210					215					220			Thr
Thr	Tyr	Phe	Asn	Leu	Lys	Gly	Ile	Gln	Ile	Asn	Asp	Pro	Ser	Ile
225				230						235				240
Ser	Asp	Ser	Val	Met	Met	Tyr	Ser	Pro	Ala	Val	Arg	His	Leu	Asn
			245						250				255	His
Tyr	Asn	Asn	Ile	Phe	Arg	Leu	Asn	Ser	Thr	Phe	Leu	Ser	Tyr	Ile
		260						265					270	Asn

Gly Lys Ala Asp Lys Cys Gly Tyr Asn Ala Phe Leu Asp Lys Ala Ile
 275 280 285
 Thr Tyr Pro Pro Pro Thr Pro Phe Pro Thr Ala Pro Glu Ile Thr Glu
 290 295 300
 Asp Cys Gln Val Trp Asp Glu Val Val Met Ala Ala Tyr Asp Ile Asn
 305 310 315 320
 Pro Cys Phe Asn Tyr Tyr His Leu Ile Asp Phe Cys Pro Tyr Leu Trp
 325 330 335
 Asp Val Leu Gly Phe Pro Ser Leu Gly Phe Gly Pro Asp Asn Tyr Phe
 340 345 350
 Asn Arg Ser Asp Val Gln Lys Ile Leu His Val Pro Pro Thr Asp Tyr
 355 360 365
 Ser Val Cys Ser Glu Thr Val Ile Phe Ala Asn Gly Asp Gly Ser Asp
 370 375 380
 Pro Ser Ser Trp Gly Pro Leu Pro Ser Val Ile Glu Arg Thr Asn Asn
 385 390 395 400
 Thr Ile Ile Gly His Gly Trp Leu Asp Tyr Leu Leu Phe Leu Asn Gly
 405 410 415
 Ser Leu Ala Thr Ile Gln Asn Met Thr Trp Asn Gly Lys Gln Gly Phe
 420 425 430
 Gln Ser Pro Pro Val Glu Pro Leu Phe Val Pro Tyr His Tyr Gly Leu
 435 440 445
 Ala Glu Leu Tyr Trp Gly Asp Glu Pro Asp Pro Tyr Asn Leu Asp Ala
 450 455 460
 Gly Ala Gly Tyr Leu Gly Thr Ala His Thr Glu Arg Gly Leu Thr Phe
 465 470 475 480
 Ser Ser Val Tyr Leu Ser Gly His Glu Ile Pro Gln Tyr Val Pro Gly
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 Pro Arg Arg Gly Thr Thr Pro Leu Asn Phe Ser
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 <212> PRT
 <213> *Aspergillus oryzae*

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 35 40 45
 His Ser Leu Lys Ile Pro Val Glu Asp Tyr Gln Phe Leu Asn Asn Lys
 50 55 60
 Thr Lys Pro Tyr Arg Val Glu Ser Leu Pro Asp Val His Phe Asp Leu
 65 70 75 80
 Gly Glu Met Tyr Ser Gly Leu Val Pro Ile Glu Lys Gly Asn Val Ser
 85 90 95
 Arg Ser Leu Phe Phe Val Phe Gln Pro Thr Ile Gly Glu Pro Val Asp
 100 105 110
 Glu Thr Thr Ile Trp Leu Asn Gly Gly Pro Gly Cys Ser Ser Leu Glu
 115 120 125
 Ala Leu Ser Pro Gly Glu Cys Arg Phe Val Trp Gln Pro Gly Thr Tyr
 130 135 140

Gln	Pro	Val	Glu	Asn	Pro	Tyr	Ser	Trp	Val	Asn	Leu	Thr	Asn	Val	Leu
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Trp	Val	Asp	Gln	Pro	Val	Gly	Thr	Gly	Phe	Ser	Leu	Gly	Val	Pro	Thr
				165					170						175
Ala	Thr	Ser	Glu	Glu	Glu	Ile	Ala	Glu	Asp	Phe	Val	Lys	Phe	Phe	Lys
				180				185					190		
Asn	Trp	Gln	Gln	Ile	Phe	Gly	Ile	Lys	Asn	Phe	Lys	Ile	Tyr	Val	Thr
		195				200						205			
Gly	Glu	Ser	Tyr	Ala	Gly	Arg	Tyr	Val	Pro	Tyr	Ile	Ser	Ala	Ala	Phe
	210					215					220				
Leu	Asp	Gln	Asn	Asp	Thr	Glu	His	Phe	Asn	Leu	Lys	Gly	Ala	Leu	Ala
225					230					235					240
Tyr	Asp	Pro	Cys	Ile	Gly	Gln	Phe	Asp	Tyr	Val	Gln	Glu	Glu	Ala	Pro
				245					250						255
Val	Val	Pro	Phe	Val	Gln	Lys	Asn	Asn	Ala	Leu	Phe	Asn	Phe	Asn	Ala
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Ser	Phe	Leu	Ala	Glu	Leu	Glu	Ser	Ile	His	Glu	Gln	Cys	Gly	Tyr	Lys
	275						280					285			
Asp	Phe	Ile	Asp	Gln	Tyr	Leu	Val	Phe	Pro	Ala	Ser	Gly	Val	Gln	Pro
	290					295				300					
Pro	Lys	Ala	Met	Asn	Trp	Ser	Asp	Pro	Thr	Cys	Asp	Val	Tyr	Asp	Ile
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Val	Asn	Asn	Ala	Val	Leu	Asp	Pro	Asn	Pro	Cys	Phe	Asn	Pro	Tyr	Glu
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Ile	Asn	Glu	Met	Cys	Pro	Ile	Leu	Trp	Asp	Val	Leu	Gly	Phe	Pro	Thr
			340					345					350		
Glu	Val	Asp	Tyr	Leu	Pro	Ala	Ala	Pro	Ala	Ser	Thr	Leu	Thr	Ala	Leu
		355				360						365			
Ile	Lys	Arg	Ala	Met	His	Ala	Pro	Asn	Ile	Thr	Trp	Ser	Glu	Cys	Ser
	370					375					380				
Val	Glu	Ser	Val	Phe	Val	Gly	Gly	Asp	Gly	Gly	Pro	Glu	Gln	Glu	Gly
385					390				395						400
Asp	Tyr	Ser	Ala	Asn	Pro	Ile	Glu	His	Val	Leu	Pro	Gln	Val	Ile	Glu
				405					410					415	
Gly	Thr	Asn	Arg	Val	Leu	Ile	Gly	Asn	Gly	Asp	Tyr	Asp	Met	Val	Ile
		420					425						430		
Leu	Thr	Asn	Gly	Thr	Leu	Leu	Ser	Ile	Gln	Asn	Met	Thr	Trp	Asn	Gly
		435				440						445			
Lys	Leu	Gly	Phe	Asp	Thr	Ala	Pro	Ser	Thr	Pro	Ile	Asn	Ile	Asp	Ile
	450					455					460				
Pro	Asp	Leu	Met	Tyr	Asn	Glu	Val	Phe	Ile	Glu	Asn	Gly	Tyr	Asp	Pro
465					470					475					480
Gln	Gly	Gly	Gln	Gly	Val	Met	Gly	Ile	Gln	His	Tyr	Glu	Arg	Gly	Leu
				485					490					495	
Met	Trp	Ala	Glu	Thr	Phe	Gln	Ser	Gly	His	Met	Gln	Pro	Gln	Phe	Gln
		500						505					510		
Pro	Arg	Val	Ser	Tyr	Arg	His	Leu	Glu	Trp	Leu	Leu	Gly	Arg	Arg	Asp
		515					520					525			
Thr	Leu														
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